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NOTICE OF ALLOWANCE AND FEE(S) DUE

23628 7590 01/26/2010

WOLF GREENFIELD & SACKS, P.C.
600 ATLANTIC AVENUE
BOSTON, MA 02210-2206

EXAMINER

PERRY, ANTHONY T

ART UNIT

PAPER NUMBER

2879

DATE MAILED: 01/26/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,936	07/08/2005	Dharam Pal Gosain	S1459.70079US00	8482

TITLE OF INVENTION: PRODUCTION METHOD FOR TUBULAR CARBON MOLECULE AND TUBULAR CARBON MOLECULE, PRODUCTION METHOD FOR RECORDING DEVICE AND RECORDING DEVICE, PRODUCTION METHOD FOR FIELD ELECTRON EMISSION ELEMENT AND FIELD ELECTRON EMISSION ELEMENT, AND PRODUCTION METHOD FOR DISPLAY UNIT

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	04/26/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
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P.O. Box 1450
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

23628 7590 01/26/2010

WOLF GREENFIELD & SACKS, P.C.
600 ATLANTIC AVENUE
BOSTON, MA 02210-2206

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,936	07/08/2005	Dharam Pal Gosain	S1459.70079US00	8482

TITLE OF INVENTION: PRODUCTION METHOD FOR TUBULAR CARBON MOLECULE AND TUBULAR CARBON MOLECULE, PRODUCTION METHOD FOR RECORDING DEVICE AND RECORDING DEVICE, PRODUCTION METHOD FOR FIELD ELECTRON EMISSION ELEMENT AND FIELD ELECTRON EMISSION ELEMENT, AND PRODUCTION METHOD FOR DISPLAY UNIT

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	04/26/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
PERRY, ANTHONY T	2879	313-310000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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10/541,936	07/08/2005	Dharam Pal Gosain	S1459.70079US00	8482
23628	7590	01/26/2010	EXAMINER	
WOLF GREENFIELD & SACKS, P.C. 600 ATLANTIC AVENUE BOSTON, MA 02210-2206			PERRY, ANTHONY T	
			ART UNIT	PAPER NUMBER
			2879	
DATE MAILED: 01/26/2010				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 667 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 667 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	10/541,936	GOSAIN ET AL.	
	Examiner	Art Unit	
	ANTHONY T. PERRY	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed 1/05/10.
2. ☒ The allowed claim(s) is/are 1,2,4,5,10,11,13,14,16,18,19,22,25-28,30,34,35,37-46 and 50-56.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. <input type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date <u>12/22/09</u> 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date ____. 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other ____. |
|--|---|

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

In the claims:

In line 2 of claim 11, "1" has been replaced with --10--.

Allowable Subject Matter

Claims 1, 2, 4, 5, 10, 11, 13, 14, 16, 18, 19, 22, 25-28, 30, 34, 35, 37-46, and 50-56 are allowed.

The following is an examiner's statement of reasons for allowance:

The prior art of record fails to disclose or fairly suggest:

- A method of manufacturing tubular carbon molecule comprising: a height equalization step of forming a tip of the tubular carbon molecule into an open tip and then inserting a magnetic material in the open tips of the plurality of tubular carbon molecules, in combination with the remaining claimed limitations as called for in claim 1 (claims 2, 4, 5, 10-11 are allowable for the same reasons since they are dependent on claim 1);
- A method of manufacturing tubular carbon molecule comprising: a depositing step of depositing the second material in a position corresponding to the heat distribution through dissipating the heat of the surface of the material substrate, and in the depositing step, a projection is formed on the surface of the material substrate through dissipating heat of the surface of the material substrate, and the

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second material is deposited on at least a tip portion of the projection, in combination with the remaining claimed limitations as called for in claim 50 (claims 13, 14, and 16 are allowable for the same reasons since they are dependent on claim 50);

- The catalyst arranging step comprising: a melting step of applying a heat distribution modulated according to a desired pattern to a surface of a material substrate so as to melt the surface of the material substrate; a master forming step of forming a projection in which at least a tip portion thereof is made of a transfer material in a position corresponding to the heat distribution on the material substrate through dissipating the heat of the surface of the material substrate so as to form a master for transfer having a pattern of the projection on a surface thereof; and a transferring step of forming a substrate through transferring the pattern of the master for transfer to a substrate to be transferred, and the tubular carbon molecule is grown on the substrate, in combination with the remaining claimed limitations as called for in claim 51 (claims 18-19 are allowable for the same reasons since they are dependent on claim 51);
- The catalyst arranging step comprising: a projection forming step of forming a projection of a pattern in a position corresponding to the heat distribution through dissipating the heat of the surface of the material substrate; and an adhering step of adhering a catalyst metal to a tip portion of the projection through pushing a metal substrate made of a metal having a catalyst function for a tubular carbon molecule to the projection, in combination with the remaining claimed limitations as called for in claim 52;

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- The catalyst arranging step comprising: a projection forming step of forming the pattern of a projection in a position corresponding to the heat distribution through dissipating the heat of the surface of the material substrate; and a planarizing step of planarizing the top surface of the projection, in combination with the remaining claimed limitations as called for in claim 53 (claim 22 is allowable for the same reasons since it is dependent on claim 53);
- The catalyst arranging step includes: a melting step of applying a heat distribution modulated according to a desired pattern to a surface of a material substrate so as to melt the surface of the material substrate; a projection forming step of forming the pattern of a projection in a position corresponding to the heat distribution through dissipating the surface of the material substrate; and a control layer forming step of forming a control layer which retards the growth of a tubular carbon molecule on a surface of the projection except for an extreme tip portion, in combination with the remaining claimed limitations as called for in claim 54;
- A catalyst arranging step of arranging a metal having a catalyst function for a tubular carbon molecule through the use of melting by a modulated heat distribution; a growing step of growing a tubular carbon molecule; a height equalizing step of forming a tip of the tubular carbon molecule in a predetermined plane, and forming the tip into an open tip; and an inserting step of inserting a magnetic material in at least a tip portion of the tubular carbon molecule from the open tip, in combination with the remaining claimed limitations as called for in claim 25 (claims 26-27 are allowable for the same reasons since they depend from claim 25);

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- A method of manufacturing a field electron emission device, wherein in the cathode forming step, two of the substrates are disposed so that the patterns of the projection face each other, and an electric field is applied between the two substrates, in combination with the remaining claimed limitations as called for in claim 28 (claims 30, 34, 35, 37-46 are allowable for the same reasons since they depend from claim 28);
- A method of manufacturing a field electron emission device, wherein an electrode including a pattern of projections corresponding to the pattern form on the substrate is used, and the pattern of the substrate and the pattern of the projections of the electrode face each other, in combination with the remaining claimed limitations as called for in claim 55;
- A method of manufacturing a field electron emission device, wherein the catalyst arranging step includes: a projection electrode forming step of forming a pattern of a projection on a surface of a flat electrode through the use of a heat distribution modulated according to a desired pattern so as to form a projection electrode; and a reducing/depositing step of forming a pattern which is made of a metal having a catalyst function and corresponds the projection electrode on the substrate through applying an electric field between the projection electrode and a conductive substrate in a catalyst solution including a metal having a catalyst function to reduce and deposit the metal, in combination with the remaining claimed limitations as called for in claim 56.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

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fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to *Anthony Perry* whose telephone number is **(571) 272-2459**. The examiner can normally be reached between the hours of 9:00AM to 5:30PM Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (571) 272-2457. **The fax phone number for this Group is (571) 273-8300.**

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Anthony Perry/

Anthony Perry
Patent Examiner
Art Unit 2879

/NIMESHKUMAR D. PATEL/
Supervisory Patent Examiner, Art Unit 2879